Name:

## at1124exam: Radicals and Squares (v807)

### Question 1

Simplify the radical expressions.

| $\sqrt{50}$ | $\sqrt{75}$ | $\sqrt{20}$ |
|---|---|---|
| $\sqrt{5 \cdot 5 \cdot 2}$ | $\sqrt{5 \cdot 5 \cdot 3}$ | $\sqrt{2 \cdot 2 \cdot 5}$ |
| $5\sqrt{2}$ | $5\sqrt{3}$ | $2\sqrt{5}$ |

### Question 2

Find all solutions to the equation below:

$$6(x-6)^2 + 2 \;=\; 98$$

First, subtract 2 from both sides.

$$6(x-6)^2 = 96$$

Then, divide both sides by 6.

$$(x-6)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 6 = \pm 4$$

Add 6 to both sides.

$$x = 6 \pm 4$$

So the two solutions are $x = 10$ and $x = 2$.

**Question 3**

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 8x = 9$$

$$x^2 + 8x + 16 = 9 + 16$$
$$x^2 + 8x + 16 = 25$$
$$(x + 4)^2 = 25$$
$$x + 4 = \pm 5$$
$$x = -4 \pm 5$$
$$x = 1 \quad \text{or} \quad x = -9$$

**Question 4**

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 - 16x + 27$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 - 8x) + 27$$

We want a perfect square. Halve -8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 - 8x + 16 - 16) + 27$$

Factor the perfect-square trinomial.

$$y = 2((x - 4)^2 - 16) + 27$$

Distribute the 2.

$$y = 2(x - 4)^2 - 32 + 27$$

Combine the constants to get **vertex form**:

$$y = 2(x - 4)^2 - 5$$

The vertex is at point $(4, -5)$.